WHAT IS CLAIMED IS:

1. A method of aligning in five degrees of freedom a multichannel laser printhead to be used in thermal transfer of material from a donor to a substrate, comprising:

a) providing a detection system forming a narrow aperture positioned in a plane parallel to the material transfer plane in the donor, a photodetector responsive to laser light passing through the narrow aperture to produce a signal, and further providing a controller adapted to produce a first and second series of laser irradiance profiles;

b) positioning the multichannel laser printhead in x and y directions parallel to the material transfer plane;

c) using a motion control system to sequentially position and scan in a direction perpendicular to the narrow aperture for at least one channel of the multichannel laser printhead and then for at least one other channel of the multichannel laser printhead relative to the aperture from an out-of-focus position through an above focus position so that the controller receives the signals from the photodetector and the motion control system to produce the first and second series of laser irradiance profiles;

d) using the first and second series of laser irradiance profiles to determine correction values needed for roll and yaw of the multichannel laser printhead and distance of the multichannel laser printhead from the material transfer plane;

e) aligning the multichannel laser printhead in accordance with the correction values whereby the multichannel laser printhead is aligned without performing a thermal transfer operation; and

f) establishing the x and y coordinates of each channel of the multichannel laser printhead with respect to x and y coordinates of the motion control system.

2. The method of claim 1 further providing an attenuator positioned between the photodetector and the narrow aperture.

3. The method of claim 1 further providing at least three sets of laser irradiance profiles from three different groups of at least one channel of the multichannel laser printhead.

4. The method of claim 1 further providing determining the offset distance between the material transfer plane and the narrow aperture plane and adjusting the position of the multichannel laser printhead in accordance with the offset distance.

5. Apparatus for detecting and aligning in five degrees of freedom a multichannel laser printhead to be used in thermal transfer of material from a donor to a substrate, comprising:

a) a detection system including a narrow aperture positioned in a plane parallel to the material transfer plane in the donor, a photodetector responsive to laser light passing through the narrow aperture to produce signals, and a controller adapted to produce a first and second series of laser irradiance profiles;

b) a motion control system for positioning the multichannel laser printhead in x and y directions parallel to the material transfer plane and including means for adjusting the roll and yaw of the multichannel laser printhead and distance of the multichannel laser printhead from the material transfer plane;

c) the motion control system sequentially positioning and scanning in a direction perpendicular to the narrow aperture for at least one channel of the multichannel laser printhead and then for at least one other channel of the multichannel laser printhead relative to the aperture from an out-of-focus position through an above focus position so that the controller receives signals from the photodetector and the motion control system to produce first and second series of laser irradiance profiles;

d) means for using the first and second series of laser irradiance profiles to determine correction values needed for roll and yaw of the

multichannel laser printhead and distance of the multichannel laser printhead from the material transfer plane; and

e) establishing the x and y coordinates of each channel with respect to the x and y coordinates of the motion control system.

6. The apparatus of claim 5 further including means for aligning the multichannel laser printhead in accordance with the correction values whereby the multichannel laser printhead is aligned without performing a thermal transfer operation.

7. The apparatus of claim 5 further including an attenuator positioned between the photodetector and the narrow aperture.

8. The apparatus of claim 5 further including providing at least three sets of laser irradiance profiles from three different groups of at least one channel of the printhead.

9. A method for measuring the performance of output of different channels from an aligned multichannel laser printhead to be used in thermal transfer of material from a donor to a substrate, comprising:

a) providing a detection system forming a narrow aperture positioned in a plane parallel to the material transfer plane in the donor, a photodetector responsive to laser light passing through the narrow aperture to produce signals, and further providing a controller adapted to produce a laser irradiance profile;

b) using a motion control system to position the multichannel laser printhead in x and y directions parallel to the material transfer plane and providing means for adjusting the roll and yaw of the multichannel laser printhead and distance of the multichannel laser printhead from the material transfer plane;

c) using the motion control system to sequentially position and scan in a direction perpendicular to the narrow aperture for a plurality of channels of the multichannel laser printhead relative to the aperture in an activated on

condition where the channels produce full output laser light above a transfer threshold and in an activated off condition wherein the channels produce output laser light below the transfer threshold so that the controller receives signals from the photodetector and the motion control system to produce a laser irradiance profile showing the variability from channel to channel in the activated on and activated off conditions.

10. The method of claim 9 further providing replacing or correcting the multichannel laser printhead when the laser irradiance profile indicates there is a problem of insufficient channel contrast, irradiance, irradiance uniformity, or channel failure.

11. The method of claim 9 further providing an attenuator positioned between the photodetector and the narrow aperture.

12. The method of claim 9 wherein the multichannel laser printhead includes a modulator, which has two separate drive conditions for polarity states.

13. The method of claim 9 further providing using the information from the laser irradiance profile to define the relationship between multichannel laser printhead output power and laser drive current.